1997

Alternative Rotational Grazing Systems at the Beef Teaching Farm

Gene H. Rouse
Iowa State University

M. Ruble
Iowa State University

Extension Number: ASL R1353

Alternative Rotational Grazing Systems at the Beef Teaching Farm

Abstract
Fifty-six acres of central Iowa corn land were seeded to bromegrass and divided with high-tensile wire into eight seven-acre plots. This bromegrass was fertilized with 70 pounds of nitrogen each spring and fall, 1987-1990. In 1991 – 1995, the nitrogen was increased to 80 pounds both spring and fall. The plots were stocked with 1.3 cow/calf pairs per acre in 1987-1991 and 1993–1995, but in 1992 the plots were stocked with 1.55 cow/calf pairs per acre. The pairs were rotated using two distinct schemes among four cells for about 150 days. The plots averaged 607 pounds of net calf weight per acre per year over nine years. Rainfall was quite variable during the grazing seasons and was reflected in calf performance as well as summer feed costs. This intensive rotational grazing system has greatly reduced both weed population and the need for mechanical clipping.

Keywords
ASL R1353

Disciplines
Animal Sciences

Alternative Rotational Grazing Systems at the Beef Teaching Farm

A.S. Leaflet R1353

Gene H. Rouse, professor of animal science, and
M. Ruble, beef teaching station manager

Summary

Fifty-six acres of central Iowa corn land were seeded to bromegrass and divided with high-tensile wire into eight seven-acre plots. This bromegrass was fertilized with 70 pounds of nitrogen each spring and fall, 1987-1990. In 1991 – 1995, the nitrogen was increased to 80 pounds both spring and fall. The plots were stocked with 1.3 cow/calf pairs per acre in 1987-1991 and 1993–1995, but in 1992 the plots were stocked with 1.55 cow/calf pairs per acre. The pairs were rotated using two distinct schemes among four cells for about 150 days. The plots averaged 607 pounds of net calf weight per acre per year over nine years. Rainfall was quite variable during the grazing seasons and was reflected in calf performance as well as summer feed costs. This intensive rotational grazing system has greatly reduced both weed population and the need for mechanical clipping.

Introduction

The purpose of the ISU beef teaching center's intensified rotational grazing system is to demonstrate to students and to livestock producers alternative management techniques for increasing bromegrass pasture productivity. This report includes nine seasons of rotational grazing utilizing cow/calf pairs. During the first six seasons (1987–1992), cow/calf pairs were rotated when the pastures were grazed down to a six-inch stubble (approximately once a week early in the growing season). During the last three seasons (1993–1995), the cow/calf pairs were rotated every other day. The most debated question is: How often should cows be rotated to maximize forage utilization?

Materials and Methods

Fifty-six acres of central Iowa corn land were seeded to bromegrass and subdivided with the Snell high-tensile power wire fencing system into eight seven-acre plots. Each set of four plots has a central hub providing water, shade, creep feed, and mineral. The fertilization program consisted of 70 pounds of nitrogen in April and 70 pounds of nitrogen in July, 1987-1990. Fertilization was increased to 80 pounds of nitrogen in April and 80 pounds of nitrogen in July in 1991-1995. Rainfall during the grazing season was recorded and is shown in Table 1 for 1987-1992 and 1993–1995.

Each year, cow/calf pairs (Av. 81, 1987–1992, Av. 80, 1993–1995) were weighed onto the pasture plots in early May. Cows were either purebred Angus or purebred Simmental. Table 2 relates initial cow weights, condition scores, and calf weights in early May, when the cow/calf pairs were placed on grass, and similar parameters in late September or early October, when the pairs were weighed off the grazing plots.

In addition to grazing the bromegrass pasture, cows received two to five pounds of corn per day during the artificial insemination season, to aid in breeding management. During 1988, 1989, 1991, and 1992, cows received additional feed due to drought conditions. In 1993, additional feed was supplied because of continuous flooding which peaked in July. In 1994, cows received five pounds of high-moisture corn per day during the entire 148-day grazing season because of their lower initial condition score in early May. The cows also were allowed to graze additional pasture for 14 days July 27-August 9, 1994, and $0.35 was charged against each pair per day because of drought conditions. Calves were creep-fed from the time they began eating until they were weaned in late September or early October. Creep feed consisted of a corn-oats mix consumed at a rate of 500-600 pounds per calf per season.

Results and Discussion

Table 1 shows average rainfall during the grazing seasons. Rainfall was quite variable during the nine years, however. The average annual rainfall from May to September was 25.6 inches, but only 1989 was near average. In 1990 and 1993, rainfall was more than 1.5 times higher than the nine-year average rainfall. Break-even price consistently increased as rainfall decreased because of increased summer feed costs to the cow. The exception was 1993, when the rainfall was persistent during the entire grazing season following one of our wettest springs on record. Breakdown price (Table 4) (1987–1992) has a $5.44 advantage due to lower fertilizer costs and heavier calf weights (Table 5) even though summer feed costs were higher.

Average cow weight and condition score changes during the grazing seasons are shown in Table 2.

Weight and condition score changes were relatively small from the beginning to the end of the grazing seasons. Rotating cows every other year seems to have an advantage (1993–1995), because the cows come off pasture with a higher gain advantage (Angus 15 pounds, Simmental 41 pounds vs 1987–1992), and higher condition score advantages (Angus .4, Simmental .4), while producing almost 2% more calf wt./cow wt. These results occurred even with the inclusion of 1993, nearly the worst performance year on record, in only a three-year summary.

Conception rates of cows grazed on this intensified rotational system are shown in Table 3. The breeding season consisted of 10 days of synchronized artificial insemination and 44 days of natural service. High conception rates confirm adequate energy levels and a well-managed breeding program.

Table 4 indicates that this grazing system has produced an average of 607 pounds of net calf weight per acre. To obtain this amount of production for cow/calf units, forage production must be excellent, and the cow herd must contain the genetic potential to produce calves weaning at 650-750 pounds at seven months of age. This table also relates the break-even price/cwt cut and return to land and management per acre at each of three calf prices. Returns are excellent when calves sell for $80-100 per hundred weight, except in 1988 and 1993 when severe weather conditions reduced grass production and calf weight, necessitating additional feeding of stored grain and forage. In 1993–1995, extra labor was required to move the cows to each new pasture every other day, because the cows were very content.

The inputs shown in Table 5 were used to calculate the returns in Table 4. Fertilization and summer feed costs, both for the cow and calf creep feed, are actual costs incurred during the grazing season. Cow winter feed, cow investment, labor, and fence and facility depreciation costs are averages calculated for typical cow/calf productions and reflect cost in our operation. These costs were held constant during the nine-year period, so that costs relative to the rotational grazing project and land changes could be compared.

In 1987-1992, during the early part of the grazing season, cow/calf pairs were moved to a new plot each week, so each plot was grazed for a week and rested three weeks. In 1990, the cows could not consume the bromegrass quickly enough, and one seven-acre plot was harvested as hay. Later in the season, cow/calf pairs were moved more frequently. In 1993–1995, the cow/calf pairs were moved every other day. In 1993, this helped keep soil compaction to a minimum. In 1994, more forage was left unharvested than in any previous year. In 1995, no summer feed for the cows was required.

The stocking rate during the grazing period (approximately 150 days) was 1.3-1.55 cow/calf units per acre.

This intensified grazing system greatly aided weed control. All immature weeds are grazed non-selectively except for thistles and ragweed. The fertilization program stimulates bromegrass production, which makes the grass so vigorous that it also chokes out undesirable forage. Cows on the intensified grazing system are susceptible to grass tetany during the entire grazing period. The grass is kept immature and lush, thus requiring added magnesium in the mineral mix. In 1993 and 1994, selenium deficiency was discovered early in the calves, and selenium was added to the mineral mix and made available in 1995.

Table 1. Rainfall averages during the grazing season.

Month	1987–1992	1993–1995
May	5.10	3.73
June	4.38	4.52
July	7.62	7.68
August	6.07	5.75
September	2.64	3.38
Total	25.81	25.06

Table 2. Average cow weight, calf weight, and cows condition score changes during grazing season.

	1987–1992 Cows					1993–1995 Cows				
	Date	Cow wt.	Cond. sc.	Calf wt.	% calf wt./ cow wt.	Date	Cow wt.	Cond. sc.	Calf wt.	% calf wt./ cow wt.
Angus										
On test	05/4	1270	6.6	164	—	05/9	1252	6.1	192	—
Off test	10/2	1280	6.0	571	44.6	9/29	1277	6.4	591	46.2
Simmental										
On test	05/4	1324	6.0	171	—	05/9	1249	5.7	191	—
Off test	10/2	1331	5.4	587	44.1	9/29	1297	5.8	596	46.0

Table 3. Conception rate averages of cows used in the intensive rotational grazing system.

	1987–1992	1993–1995
% AI conception	63.7	46.6
% Pregnant	89.7	88.4

Table 4. Calf weight and per acre averages to land and management.

	1987–1992	1993–1995
Net calf weight/acre	619	582
Break-even $ of calf/cwt	71.28	76.72
	Return to land and management $/acre	
Calf price cwt		
100	179.26	135.78
90	117.39	77.70
80	55.53	19.38

Table 5. Average yearly $ inputs per acre to produce calf weights shown in Table 4.

	1987–1992	1993–1995
Fertilization	25.66	34.29
Cow investment	120.00	120.00
Summer feed	86.47	80.65
Cow winter feed	137.28	137.28
Labor	35.00	35.00
Fence and facility depreciation	35.00	35.00
Total	439.41	442.22